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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/398,006	09/16/1999	YOICHI OKAMOTO	Q55806	9551

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EXAMINER
FISCHER, JUSTIN R

ART UNIT	PAPER NUMBER
1733	20

DATE MAILED: 02/06/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application N .	Applicant(s)	
	09/398,006	OKAMOTO ET AL.	
	Examiner	Art Unit	
	Justin R Fischer	1733	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *14 January 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-7* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-7* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bourdon (US 2,493,614, newly cited) in view of either one of Kabe (US 4,711,286, newly cited) or Suzuki (US 4,086,948, newly cited). As best depicted in Figures 1 and 2, Bourdon is directed to a pneumatic tire construction having at least one carcass ply extending between a pair of bead cores and a belt reinforcement structure consisting of three, rubberized steel cord layers, wherein (a) the radially innermost and middle steel cord layers (2A,2B) form a pair of crossed belt layers having an inclination angle of between 17 and 28 degrees with respect to the equatorial plane of the tire and (b) the radially outermost steel cord layer (2C) is formed of reinforcing elements having an inclination between 45 and 90 degrees with respect to the equatorial plane of the tire, such that said radially outermost steel cord layer extends axially outward of an outermost groove in the tread portion. In describing the carcass, however, the reference is completely silent as to whether the carcass is of a radial construction or a bias construction or both. In any event, it is extremely well known and conventional in the manufacture of current tires to use radial carcass plies, as compared to bias carcass plies. For example, Kabe (Column 1, Lines 13-16) and Suzuki (Column 1, Lines 9-12)

provide two examples of the well-known use of radial carcass plies in a variety of current, pneumatic tires for the benefits of improved reinforcement/wear characteristics. As such, one of ordinary skill in the art at the time of the invention would have readily appreciated the pneumatic tire of Bourdon to be formed with a radial carcass since this construction is extensively used in the manufacture of a variety of current, pneumatic tires, as compared to the bias carcass construction that was previously used.

Regarding claim 5, applicant requires that the cord to cord distance between the end of the middle cord layer and the adjacent outermost cord layer is greater than 0.15 times the cord to cord distance between the same end of the middle cord layer and the adjacent inner layer. A fair reading of the reference as a whole, as would be expected by one of ordinary skill in the art at the time of the invention, suggests that the relevant distances would be approximately the same, there being no evidence of any unique spacing between the respective belt plies. Thus, the cord to cord distance (defined by topping rubbers) between the middle cord layer and the outermost cord layer would be approximately 1.0 times the cord to cord distance between the middle cord layer and the inner cord layer.

3. Claims 1 and 3-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Farnsworth (GB 1,483,053, newly cited). As best depicted in Figures 3b and 3c, Farnsworth teaches a radial, pneumatic tire construction having at least one carcass ply extending between a pair of bead cores and a belt reinforcement structure consisting of three, rubberized steel cord layers, wherein (a) the radially innermost and middle steel cord layers (L,L') form a pair of crossed belt layers having an inclination angle of between 10 and 25 degrees with respect to the equatorial plane of the tire and (b) the

radially outermost steel cord layer (H) is formed of reinforcing elements having an inclination between 40 and 70 degrees with respect to the equatorial plane of the tire (Page 1, Lines 57-79). In these instances (Figures 3b and 3c), the radially outermost steel cord layer defines the maximum axial width of the breaker or belt assembly, wherein the maximum axial width is between 90 and 110% of the axial width of the tread. Although Farnsworth fails to expressly depict the inclusion of grooves in the tread region, tread grooves represent a fundamental component of tires, including the heavy-duty tire of Farnsworth that is used on trucks and additional commercial vehicles. As such, one of ordinary skill in the art at the time of the invention would have expected the tire of Farnsworth to contain a plurality of tread grooves as is conventional in pneumatic tire constructions. Furthermore, one of ordinary skill in the art at the time of the invention would have readily appreciated the axial extension of the radially outermost steel cord layer beyond the axial outermost tread groove since said radially outermost steel cord layer is described as having an axial width that is between 90 and 110% of the axial width of the tread (axial width of tread is greater than axial position of outermost groove). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to form the pneumatic, radial tire construction of the claimed invention, including the belt assembly/arrangement of the claimed invention, in view of Farnsworth.

Regarding claims 3 and 4, Figures 3b and 3c depict the radially outermost cord layer having a width that covers both widthwise ends of the middle cord layer. In particular, with respect to claim 4, the width of the radially outermost cord layer is necessarily greater than 1.0 times the width of the middle cord layer. Furthermore, it is

evident from Figures 3b and 3c and based on a fair reading of the reference as a whole, that the width of the radially outermost cord layer is less than 20% greater than the width of the middle cord layer (depicted as being slightly greater than middle cord layer).

With respect to claim 5, applicant requires that the cord to cord distance between the end of the middle cord layer and the adjacent outermost cord layer is greater than 0.15 times the cord to cord distance between the same end of the middle cord layer and the adjacent inner layer. A fair reading of the reference as a whole, as would be expected by one of ordinary skill in the art at the time of the invention, suggests that the relevant distances would be approximately the same, there being no evidence of any unique spacing between the respective belt plies. Thus, the cord to cord distance (defined by topping rubbers) between the middle cord layer and the outermost cord layer would be approximately 1.0 times the cord to cord distance between the middle cord layer and the inner cord layer.

4. Claims 1, 3, and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ishiguro (JP 04163209, newly cited) in view of either one of Matsunuma (US 4,518,024, newly cited) or Takagi (JP 06032105, newly cited). As best depicted in Figure 1, Ishiguro is directed to a pneumatic, radial tire construction for use on bad roads (i.e. work vehicles, construction) comprising at least one carcass ply extending between a pair of beads and a belt structure comprising (a) an inner and middle belt layer having reinforcing elements that are inclined at an angle between 10 and 45 degrees with respect to the equatorial plane of the tire and (b) a radially outermost layer formed of steel cords that are inclined at an angle between 30 and 90 degrees with respect to the equatorial plane of the tire. It is further evident from Figure 1 that the

radially outermost cord layer extends well into the lower sidewall regions and thus axially outward of an outermost tread groove (though not expressly depicted, they define a fundamental component of the tread portion). Thus, the reference is only devoid of a specific teaching with respect to the use of steel cords in the inner and middle belt layers. Regarding this construction, it should be noted that Ishiguro is completely silent with respect to the inner and middle belt materials. In any event, one of ordinary skill in the art at the time of the invention would have readily appreciated the use of steel cords in the inner and middle belt layers of Ishiguro since it represents an extremely well known belt design having a high degree of strength and reinforcement capabilities that is extensively used in the manufacture of a variety of tires, especially heavy duty tires. For example, Matsunuma (Column 1, Lines 53-66) and Takagi (Abstract) are similarly directed to pneumatic radial tires designed for use on bad roads (i.e. construction) in which a steel belted construction is preferred. As such, one of ordinary skill in the art at the time of the invention would have found it obvious to form the tire of the claimed invention, including the use of steel cords in the inner and middle belt layers, in view of Ishiguro.

With respect to claim 5, applicant requires that the cord to cord distance between the end of the middle cord layer and the adjacent outermost cord layer is greater than 0.15 times the cord to cord distance between the same end of the middle cord layer and the adjacent inner layer. A fair reading of the reference as a whole, as would be expected by one of ordinary skill in the art at the time of the invention, suggests that the relevant distances would be approximately the same, there being no evidence of any unique spacing between the respective belt plies. Thus, the cord to cord distance

(defined by topping rubbers) between the middle cord layer and the outermost cord layer would be approximately 1.0 times the cord to cord distance between the middle cord layer and the inner cord layer.

5. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over either one of (a) Bourdon, Kabe, and Suzuki, (b) Farnsworth, or (c) Ishiguro, Matsunuma, and Takagi as applied to claim 1 above, and further in view of Kohno (US 5,968,295, of record). As previously mentioned, each of the aforementioned combination of references teaches all the limitations of the independent claim. Although the references are completely silent with respect to the modulus of the coating rubber in the radially outermost, steel cord layer, one of ordinary skill in the art at the time of the invention would have readily appreciated the broad range of the claimed invention (greater than 200 kgf/cm^2) as defining extensively used coating rubber compositions in similar belt plies. For example, Kohno is directed to an outermost belt layer formed of steel in which the coating rubber has a modulus greater than 200 kgf/mm^2 in order to prevent the cords of this belt layer from moving and causing local buckling of said cord (Column 4, Lines 47-55). It is noted that this benefit is the exact same benefit detailed by the claimed invention (Page 9, 2nd Paragraph). Thus, one of ordinary skill in the art at the time of the invention would have found it obvious to form the coating rubber of the outermost cord layer in either one of Bourdon, Farnsworth, or Ishiguro with a modulus greater than 200kgf/cm^2 as such a construction is extensively used in outermost belt plies formed of steel for the benefits detailed above, as evidenced by Kohno.

6. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over either one of (a) Bourdon, Kabe, and Suzuki or (b) Farnsworth as applied to claim 1 above, and

further in view of Okamoto (US 5,779,828, of record). As previously mentioned, each of the aforementioned combination of references teaches all the limitations of the independent claim. The references, however, are silent with respect to the employment of an end cover rubber having a wavy surface in accordance to the limitations of the claimed invention (peak to trough distance of between 0.05 and 0.25 mm). In any event, a variety of end cover rubbers are conventionally used in the ends of breaker or belt layers to prevent "end separation". Okamoto describes a specific type of end cover rubber in the belt region having a wavy surface and a peak to trough distance of between 0.05 and 0.25 mm, which mimics the range outlined by the claimed invention (Column 8, Lines 53-61). Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to include the specified wavy end cover rubber, as suggested by Okamoto, in the general tire construction of either one of Bourdon or Farnsworth. The use of such a wavy end cover rubber provides reinforcement in both the radial and axial direction, further reducing the occurrence of "end separation".

7. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over either one of (a) Bourdon, Kabe, and Suzuki or (b) Farnsworth as applied to claim 1 above, and further in view of as applied to claim 1 above, and further in view of Imamura (US 3,913,652, of record). As previously mentioned, each of the aforementioned combination of references teaches all the limitations of the independent claim; however, the references are silent with respect to the use of an end cover rubber that is joined to a widthwise outer end face of the cord layer over a full periphery of the cord layer, as depicted in Figure 11. In any event, as stated in Paragraph 6, a variety of end cover rubbers are conventionally used in the ends of breaker or belt layers to prevent "end

separation". Furthermore, Imamura et al. depict multiple arrangements of conventional end cover rubbers, including an embodiment in which the end cover rubber is joined to a widthwise outer end face of the cord layer over a full periphery of the cord layer (Figure 1C). In describing the width of the end cover rubber or rubber reinforcing layer, Imamura et al. provide multiple embodiments (Examples 4 and 5) in which the gauge of the end cover rubber is approximately 1 millimeter, which is well within the large range of 0.05-5.0 millimeters defined by the claimed invention. As such, it would have been obvious to one of ordinary skill in the art at the time of the invention to employ an end cover rubber in accordance to the limitations of the claimed invention, as suggested by Imamura et al., in the general tire construction defined by either one of Bourdon or Farnsworth. This particular type of end cover rubber represents one of many conventional such rubbers used to prevent "end separation" and would have been readily appreciated by one of ordinary skill in the art.

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Tsuda (JP 06262904) teaches a pneumatic, radial tire construction having at least one carcass ply and a belt reinforcement structure consisting of (a) an inner and middle steel cord layer having reinforcing elements that are inclined at an angle of 22 degrees with respect to the equatorial plane of the tire and (b) an outermost steel cord layer having reinforcing elements that are inclined at an angle between 30 and 60 degrees with respect to the equatorial plane of the tire. The reference further requires the radially outermost steel cord layer have an axial width that

is equal to between 15 and 70%, preferably 30-50%, of the tread ground contacting width.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to **Justin R Fischer** whose telephone number is **(703) 605-4397**. The examiner can normally be reached on M-F (7:30-4:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Ball can be reached on (703) 308-2058. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

Justin Fischer

January 28, 2003

Michael W. Ball
Supervisory Patent Examiner
Technology Center 1700